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## Technical Memorandum

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### *Significant Phosphorus and Sediments Nonpoint Sources in the Centennial Lake Watershed*

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Annual TMDLs for phosphorus and sediments are being proposed in the Centennial Lake watershed. EPA requires that TMDL allocations account for all significant sources including both “natural” and human-induced components. This technical memorandum identifies the distribution of maximum allowable nonpoint source (NPS) loads among different source categories. These load contributions are conceptual values that are within the proposed TMDL threshold. They represent viable individual allocations to each source category. Maryland Department of the Environment (MDE) expressly reserves the right to allocate the TMDLs among different sources in any manner that is reasonably calculated to achieve water quality standards.

The NPS loads were determined using land use loading coefficients. The land use information was based on 1997 Maryland Department of Planning data. The total NPS load was calculated by summing all of the individual land use areas and multiplying by the corresponding land use loading coefficients. The loading coefficients were based on the results of the Chesapeake Bay Program Phase 4.3 Model (Segment 340), which is a continuous simulation model and urban loading from MDE’s HSPF model. The Chesapeake Bay Program nutrient loading rates account for atmospheric deposition<sup>1</sup>, loads from septic tanks, and loads coming from urban development, agriculture, and land covered by forest or other herbaceous growth. The loading rates account for both “natural” and human-induced sources. The current total NPS phosphorus load is estimated to be 1,230.2 lbs/yr.

The computations of the phosphorus and sediments TMDLs are presented in the report *Total Maximum Daily Loads of Phosphorus and Sediments for Centennial Lake*, MDE, October 2001. The annual TMDL for phosphorus is 664 lbs/yr and the TMDL for sediments is 897.1 tons/yr. Table 1 and Table 2 provide possible scenarios for the distribution of phosphorus and sediment NPS loads between different source categories. The phosphorus TMDL allocation to nonpoint sources is 597.6 lbs/year.

The NPS load distribution under the TMDL is based upon estimated reductions needed to achieve the target NPS goal. For the purpose of illustrating one possible scenario, the percent reductions needed to achieve the NPS goal are applied equally to each nonpoint source category within the watershed. The percent reduction can be calculated by dividing the difference between the NPS target load and the current NPS load by the current NPS load (Current Load - Target Load)/(Current Load).

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<sup>1</sup> Atmospheric deposition to the land surface is accounted for in the land use loading coefficients.

**Table 1**  
**Phosphorus Loads Attributed to Significant Nonpoint Sources**  
**For Average Annual Phosphorus TMDL**

<b>Source Category</b>	<b>Percent of Nonpoint Source Load</b>	<b>Nonpoint Source Load (lbs/yr)</b>
<b>Agriculture</b>	66 %	394.4
<b>Developed</b>	33%	197.2
<b>Forest and Herbaceous Cover</b>	1 %	6
<b>TOTAL</b>	<b>100 %</b>	<b>597.6</b>

MDE anticipates that, when considering detailed implementation, opportunities and priorities for nonpoint source reductions will vary throughout the watershed. For example, giving consideration to transport losses from different parts of the watershed could suggest more cost-effective means of achieving the overall goal. In addition, cost-effectiveness will be considered in meeting the load reductions as part of any detailed implementation strategy. Any implementation strategy that might shift reductions among the land uses would be done in a manner that involves stakeholders and would be consistent with the TMDL goal.

The current load estimates are based on broad-scale simulation of land use loading rates. Efforts are underway to update the Chesapeake Bay Watershed model, and MDE anticipates that better estimates will be available in the future.

**Table 2**  
**Sediment Loads Attributed to Significant Nonpoint Sources**  
**For Average Annual Sediment TMDL**

<b>Source Category</b>	<b>Percent of Nonpoint Source Load</b>	<b>Nonpoint Source Load (Tons/yr)</b>
<b>Agriculture</b>	82.3 %	738.3
<b>Developed</b>	14.5	130.1
<b>Forest and Herbaceous Cover</b>	3.2 %	28.7
<b>TOTAL</b>	<b>100 %</b>	<b>897.1</b>